The objective of this document is to provide you with current and helpful information regarding water protection, and the Michigan Agriculture Environmental Assurance Program (MAEAP).

Consider Weather Forecasts When Planning Fertilizer and Manure Applications

Fertilizers and manures are most susceptible to runoff losses when recent surface applications are subjected to heavy rainfall events. Today in the Lake Erie basin, upwards of 80% of P losses can be tracked to just 10% of the loss events, driven by high rainfall events. Over the last few decades, shifts in rainfall patterns have led to more intense precipitation events, changing nutrient loss patterns from farm fields. While these heavier storm events undoubtedly make nutrient management more complex, taking weather considerations into account when making fertilizer and manure applications can minimize the potential for storms to transport nutrients off fields and into water bodies.

Nutrient losses from agricultural fields primarily occur when high concentrations of nutrients are transported off the field via water. These nutrients may be attached to soil particiles or they may be dissolved in the water carrying them off the field. Controlling soil erosion is important to limit the transport of nutrients attached to soil particles, but addressing dissolved nutrient losses is an increasing focus of water protection efforts.

Phosphorus in surface applied fertilizers and manures can easily be dissolved in runoff water, leading to significant nutrient losses. Within around ten days, surface phosphorus will chemically bind to soil particles and have a decreased loss potential. Tillage can speed this process further by increasing soil to nutrient contact, as well as moving nutrients off the soil surface where they don’t directly interact with heavy rainfall, but tillage operations can dramatically increase erosion losses in some instances. Still, research results have indicated when a moderate rainfall event occurs within 24 hours of a nutrient application, nutrient losses are decreased if the nutrients have been incorporated. If ten days passes before a rainfall event, few differences in nutrient losses are seen between tilled and untilled fields.

Fertilizer and manure applicators can take several steps to minimize dissolved nutrient losses off fields. When tillage is already a planned part of field operations, timing those tillage operations to be performed shortly after nutrient applications is likely to minimize nutrient losses. In no-till environments, ensuring several days between applications and forecasted storm events can significantly reduce losses. Avoiding nutrient applications altogether before forecasted storm events is advised. Taking the simple steps of considering weather forecasts and adjusting the timing of field operations as a result can play a significant role in minimizing nutrient losses.